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ABSTRACT

As part of a long range study of language behavior, six teenage mentally retarded males (IQ 37 to 64) were interviewed, and tapes were made to record language samples. Linguistic competence was found to be adequate while language performance was deficient. The sentence repetition test was found to be a useful predictor of problem areas for high corpus-error informants but not for those making few corpus errors. (Author/RJ)

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AUDITORY PERCEPTUAL ABILITY RELATED TO LANGUAGE ACQUISITION IN MENTALLY - RETARDED CHILDREN

James T. Graham
Louella W. Graham
Emory University
Atlanta, Georgia 30322

December, 1969

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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LANGUAGE CHARACTERISTICS OF THE MENTALLY RETARDED

James T. Graham
Louella W. Graham

Emory University

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SUMMARY

The mentally retarded have long been recognized as having a high incidence of language problems. The overall research project, of which this report is a part, is attempting to provide qualitative and quantitative data about the language behavior of the mentally retarded. The methods used in these studies are those of transformational-generative grammar. At the present stage in data analysis corpus material from six teenaged mentally retarded informants (IQ 37-64) indicates that variations in usage and errors for syntactic units are closely related to IQ levels. For these informants linguistic competence is adequate and it appears that only language performance is deficient. The use of ellicited imitation of model sentences with the same informants indicates that the sentence repetition test is a useful predictor of problem areas for high corpus-error informants, but not for informants making few corpus errors.

INTRODUCTION

As the first stage of a long range study of language behavior, a group of mentally retarded informants were interviewed. The resulting corpus material was analyzed for syntax and the informants were then given a sentence repetition test to further probe their language behavior.

Currently the investigators are continuing their analyses and are developing the deep structure of the retardates' syntax and the transformational rules involved in the generation of the surface structure. The present report consists of the first two studies, Surface Structure Syntax and The Sentence Repetition Test. Earlier versions of these papers were presented at the 1969 meeting of the American Association on Mental Deficiency.

SURFACE STRUCTURE SYNTAX

Although careful and extensive work on certain aspects of language behavior in the mentally retarded (MR) has been reported (Matthews, 1957; Schiefelbush, 1963), the present investigators have found neither qualitative nor quantitative descriptions that they consider adequate for an understanding of the basic language characteristics of MR individuals. Since such data were considered essential in a long-term study that was being undertaken, the decision was made to gather samples of language from a group of institutionalized MR subjects and to analyze the syntax used on the basis of rules from transformational-generative grammar in order to derive a systematic description of the language of the members in the group.

The present day techniques of transformational-generative grammar have been developed primarily by Chomsky (1957). These techniques are not static, but are constantly being revised in an effort to arrive at a more universal description of language. The major attraction of this technique for analyzing the language samples of the subjects in the present investigation is that it provides a means for evaluating linguistic performance as well as for closely estimating linguistic competence. (See Chomsky, 1964 and McNeill, 1966 for discussions of linguistic performance and competence).

Sufficient data have now been gathered and analyzed to indicate to the authors that there are certain common features in the data from all informants. Complete data reduction will require considerable time and, therefore, complete results will be reported in future papers. The present report is intended to outline the basic methodology, the techniques being used in data analysis, and the results of analysis of surface structure syntax.

METHOD

The six informants to be discussed were male residents enrolled in the academic program of the Fort Wayne (Indiana) State Hospital and Training Center, a state residential facility for the mentally retarded. Salient factors concerning each informant are presented in Table I. These data support dividing the informants into two groups on the basis of IQ.

While it would be desirable from the standpoint of research design to indicate that the data were obtained in a uniform manner from all informants, anyone who has attempted to collect language samples from an MR population will know from experience that this is not practical. The major concern of the investigators was that a corpus of representative language be obtained from each informant and two techniques were used to elicit such language. First, each informant was engaged in conversation about himself, his home, his work in school, or any other

TABLE I
DESCRIPTION OF INFORMANTS

Informant	Chron Age	WISC FISQ	WISC VIQ	Etiology
RC	15	37	47	cultural familial
MB	15	39	44	congenital cerebral deficit
DN	15	39	48	encephalopathy
CN	14	56	62	encephalopathy
BKu	15	62	61	uncertain
BK	14	64	71	encephalopathy

topic that seemed fruitful and, second, he was asked to tell a story about or describe a set of pictures which showed scenes such as a farmyard, a boy washing a wagon, or a birthday party. In some cases, multiple sessions were required before an adequate sample was obtained. In the case of one prospective informant, eight sessions did not provide an acceptable sample. All interviews were tape-recorded for subsequent transcription and analysis.

DATA ANALYSIS

The authors previewed the recordings of each interview and decided on the basis of the amount of language elicited and the quality of the recording itself when the material from a given informant was acceptable for analysis. The corpus was then transcribed into a rough draft which the authors reviewed by listening to the original tape as many times as necessary to resolve all lexical items, a procedure which often required a large number of replays of a single phrase before positive identification could be made. The editing of the preliminary transcript can be a very time consuming process. In one case, four hours of editing were required to resolve a fifteen minute recording. Our experience with the task indicates that even when the editors are practiced listeners, the use of two people to review the tapes is mandatory if an accurate final transcript is to be obtained. After all lexical items were resolved, the corpus was divided into sentences. Simple one-word responses of affirmation or negation were not counted as sentences nor were they included in the analysis.

The list of sentences provided the basic data for analysis. As a group, the six informants produced a substantial number of complete and correct sentences but for some of the informants the majority of the sentences were elliptical, for example, the response Home in reply to the question Where are you going? instead of the complete response I am going home. Based on context, elliptical utterances were expanded into complete

sentences. In the process of expansion, the authors always attempted to make the simplest possible additions. For example, the sentence The picture is green and red actually means The picture is green and the picture is red; two separate sentences joined by the conjunction and. But if in response to an interviewer's question What color is the picture?, an informant said green and red, the sentence was expanded only to The picture is green and red (see Figure 1d; this demonstrates the use of s to indicate any fragment of an S present in the utterance). Following this expansion process, each sentence from an informant's corpus was then analyzed in accordance with the phrase structure rules shown in Table II. The diagrammed sentence was then scored in terms of its overall characteristics and any specific errors it contained. Examples of the application of phrase structure rules to the analysis of surface structure are presented in Figure I.

In a few instances lexical items were used in a way that was inconsistent with their usual definitions, for example, The boy is in his bed making up the bed. In this sentence, bed was used to mean bedroom as well as *something to sleep on. These problems are most closely related* to the semantics of language and their resolution requires the development of the deep structure of the sentence and the use of transformations. Since surface syntax alone was being examined at this time, transformations were not employed. Therefore, the analysis of errors was restricted to ommissions of obligitory items, to lack of agreement between subject and verb (case), and to incorrect usage of tense (concordance). The areas of semantic content as well as deep structure and transformational rules will be examined in subsequent reports.

In terms of its overall characteristics of syntax a sentence can be (1) complete and correct, (2) complete with errors, (3) an acceptable ellipsis or (4) an ellipsis with errors. Examples of these four types of sentences are shown in Table III. The first category, complete and correct, requires no comment. In the second example both sentences are complete, but the first contains a case error and the second a concordance error. The third sentence illustrates an acceptable deletion of lexical items, in this case a noun phrase and copula verb, when they are understood from the context provided by the preceding question. It should be noted at this point that the utterance was expanded only when a complete sentence (see Table II, rule 2) was not given and that expansion was terminated when one sentence was acheived. The final example contains unacceptable deletions and it was this type of error that occurred most frequently in the corpus material. In the sample sentence, She has got a balloon, the noun balloon requires a determiner. Several determiners could be used in this example and the choice of a was arbitrary. It will be recalled that in the phrase structure rules, determiners are optional; but, while this is true in a general sense, lexically some

TABLE II
PHRASE STRUCTURE RULES

1. SENTENCE → (INTERROG) (ADV) (CONJ) S (s) (SENTENCE)

2. S → NP + VP

3. NP → (D) { { N / PRON } (PP) ({ S / s / S rel }) / { S / s } }

4. D → { ART / POSS / ADJ } (D)

5. VP → (ADV) AUX + MV

6. AUX → { TENSE / INFIN } (MODAL) (NEG) (ASPECT)

7. MV → (ADV) { COP + PRED / V_I / V_I (ADV) + NP } (ADV)

8. ADV → { ADJ / PP / Adv / NEG } (ADV)

9. PRED → { NP / ADV }

10. PP → PREP + NP

11. S rel → { rel pron + VP / rel pron + S }

Figure 1 Applications of phrase structure rules in the analysis of syntax.

a. "My mom sent them to me."

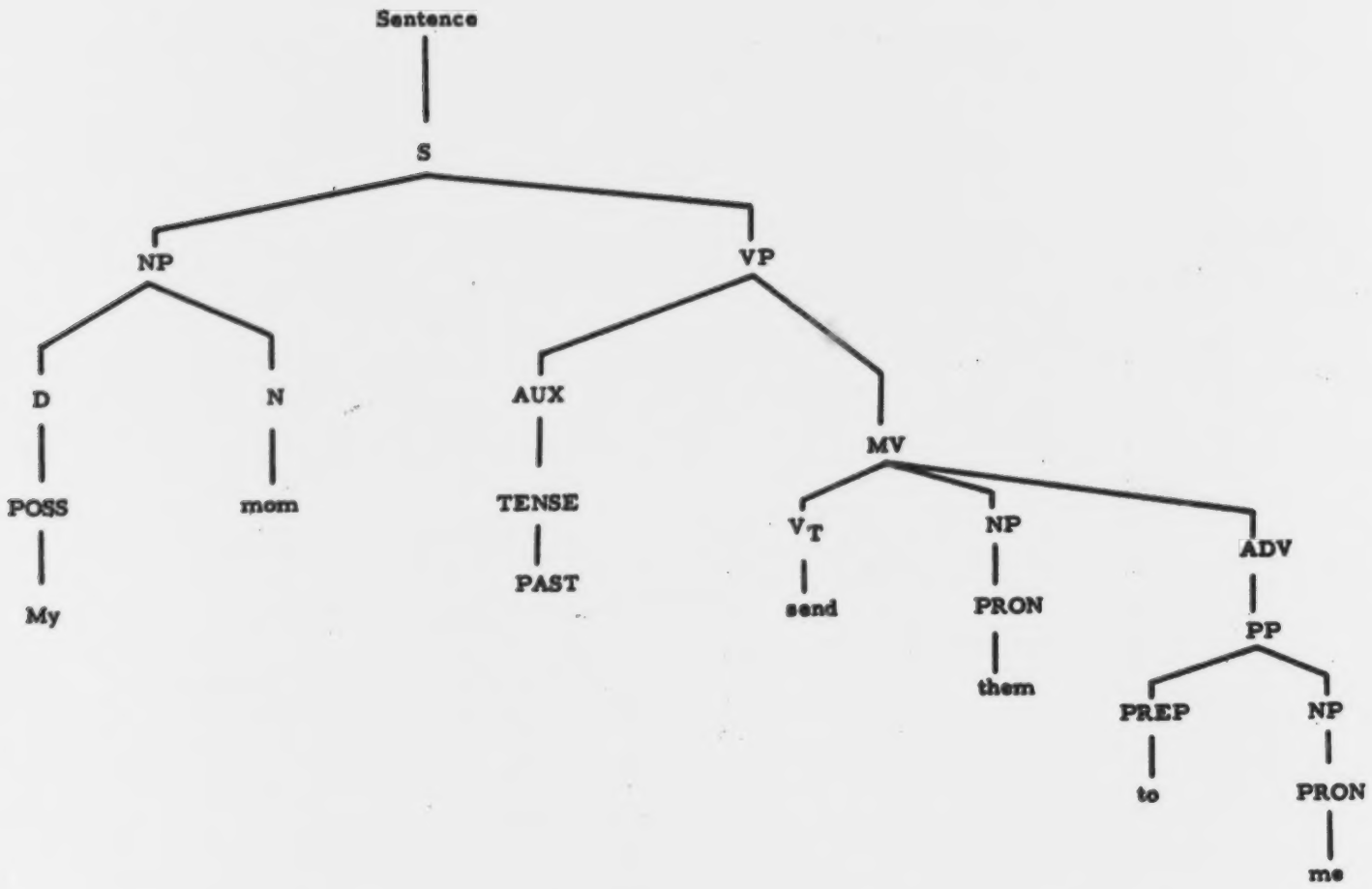
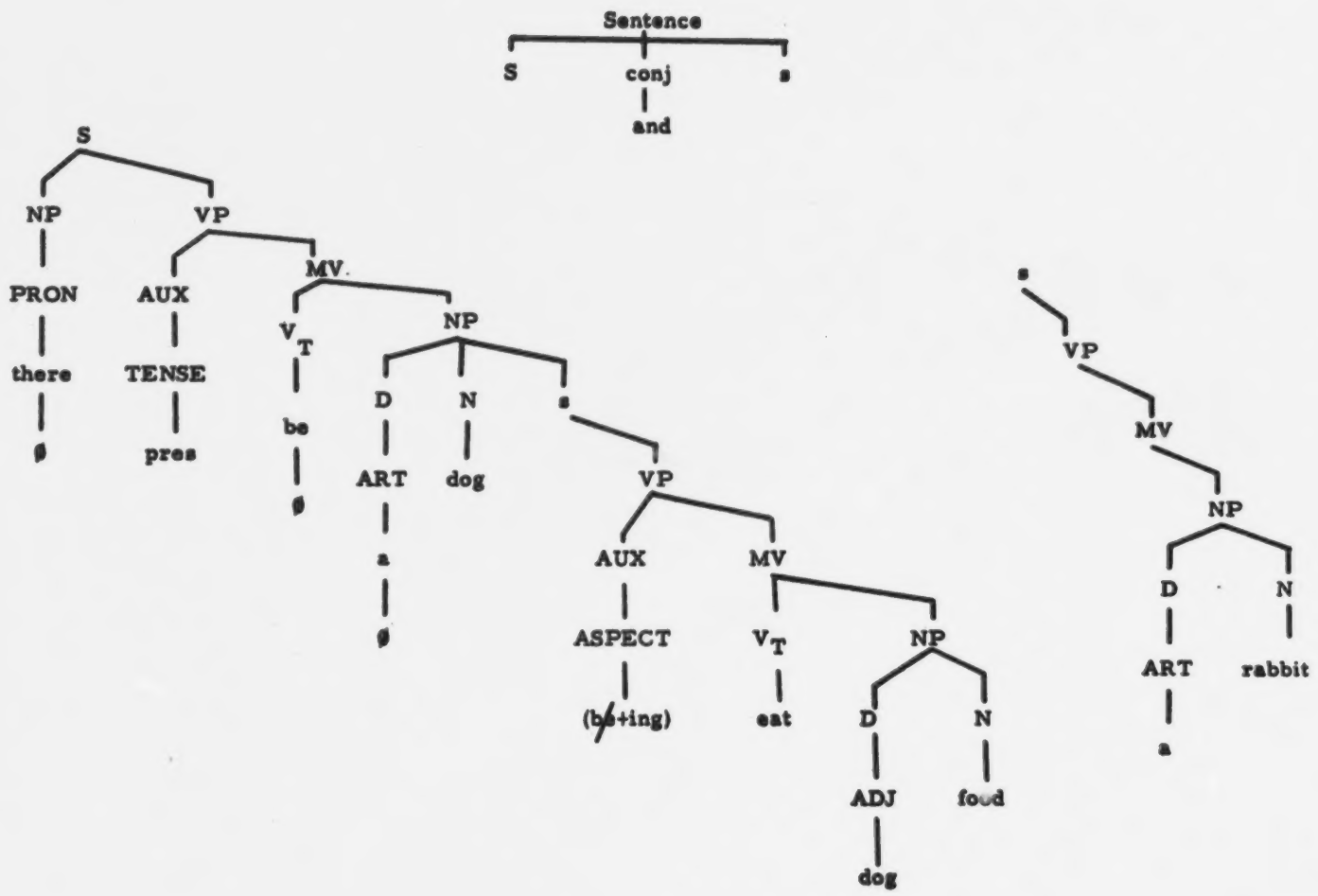


Figure 1 Applications of phrase structure rules in the analysis of syntax.

b. [There is a][1] "dog eating dog food and a rabbit."

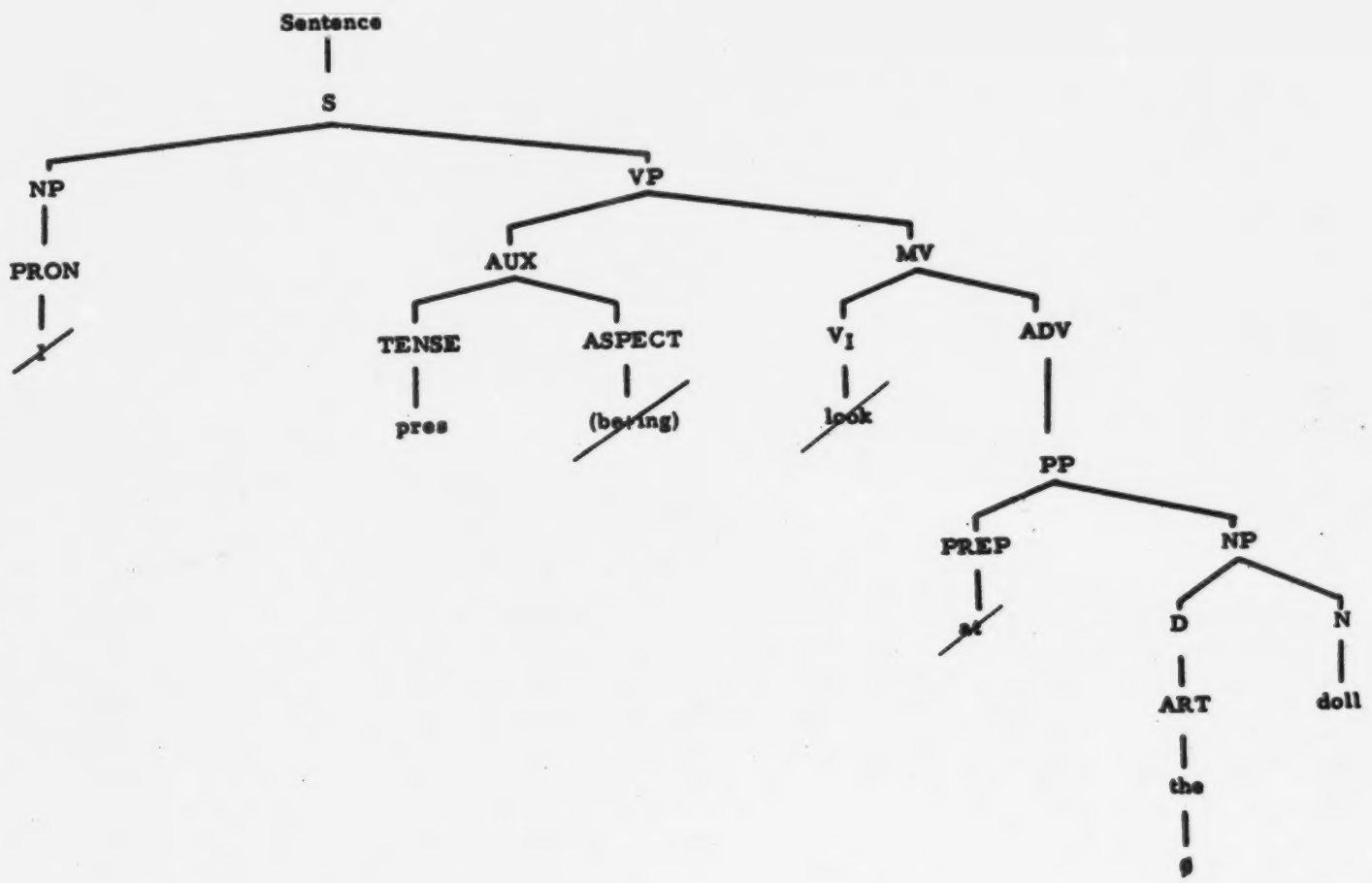


[1]Items in [] and subscripted by ∅ indicate unacceptable deletions.

Figure 1 Applications of phrase structure rules in the analysis of syntax.

c. Interviewer: "What are you looking at?"

Informant: (I am looking at)[2] [the] "doll."

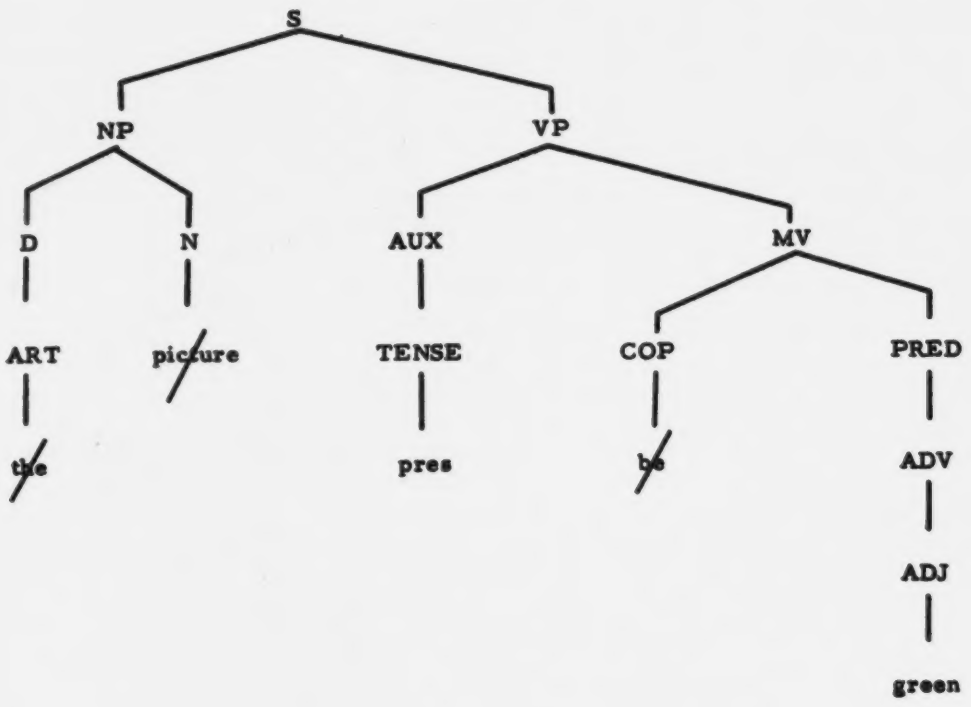


[2]Items in () or with a / through them indicate acceptable deletions.

Figure I Applications of phrase structure rules in the analysis of syntax.

d. Interviewer: "What color is the picture?"

Informant: (The picture is) "green and red."



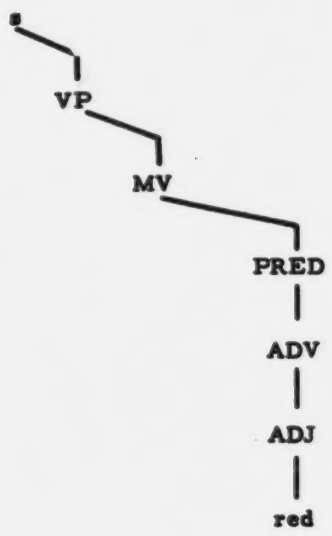


TABLE III
ILLUSTRATIONS from CORPUS MATERIAL
of SENTENCE TYPES

1. Complete and correct
   My mom sent them to me.
2. Complete with error
   Some is playing on the swing. (case)
   He was walking and he falls. (concordance)
3. Acceptable ellipsis
   What is he doing?
   (He is) pulling her.
4. Ellipsis with errors
   What does she have?
   She [has] got [a] balloon.

nouns require the presence of one or more determiners to define the specific use intended for the noun in the sentence. From context and in the form the response was given, it also was obligatory that the verbal auxiliary of aspect, has, be used.

RESULTS

The data from the six informants can be described on several levels. With reference to the sample sentences of Table III, Table IV shows the

TABLE IV
DISTRIBUTION OF CORPUS SENTENCE TYPES FOR SIX INFORMANTS

Informant/ IQ	Complete Sentences	Elliptical Sentences	Total Sentences	Defective Sentences	Defective Sentences (% of total)
RC/37	23	44	67	32	47.7
MB/39	26	44	70	38	54.3
DN/39	36	46	82	37	45.1
CN/56	41	39	80	37	46.3
BKu/62	90	57	147	54	36.7
BK/64	73	38	111	28	25.2

distribution of sentence types for each of the six informants. The category complete sentences contains a group of sentences like those of examples 1 and 2. Elliptical sentences refer to examples 3 and 4. Defective sentences contains those that were either complete with error (example 2) or elliptical with error (example 4). It is clear that in the total number of sentences shown for each informant a quantitative difference in performance occurs as the intelligence test scores increase. This difference is also reflected in a comparison of the number of defective sentences relative to the total

number of sentences. In other words, the informants with higher IQ's produced a larger number of sentences and of these, in general, a lower percentage of them were defective sentences. In Table V the same differences in performance can be seen in the lexical item analysis of

TABLE V
ANALYSIS OF CORPUS LEXICAL ERRORS FOR SIX INFORMANTS

Informant	Average Sentence Length in Lexical Items	Lexical Total	Deletion of Required Lexical Items	Lexical Error Rate (%)
RC	4.9	326	57	17.5
MB	4.9	345	55	15.9
DN	6.0	490	64	13.1
CN	6.5	516	67	12.9
BKu	8.4	1237	52	4.2
BK	7.7	855	25	2.9

each corpus. Although differences in the total number of lexical items produced by each informant could not be evaluated directly since the length of the interview varied somewhat from informant to informant, the sessions were of approximately the same length and it is important to note that the total output tended to increase as a function of IQ level. The data in Table V further indicate that the number of errors did not necessarily increase as output increased. When the lexical error rate is used as the criterion measure, the relation of accuracy to increased output can be seen even more clearly. With the exception of the most verbal informant an increase in output always was accompanied by a decrease in error rate.

In the past, the results of language studies often have been expressed in terms of the total number of errors an informant makes (Carrier & Shames, 1968; De Hirsch, Jansky & Langford, 1964). Since this approach does not take the ratio of total output to error output into account, it can easily lead to erroneous conclusion. As can be seen in Table V, the use of the absolute number of lexical errors as the criterion of performance could lead one to say that BKu and MB have essentially the same command of syntax. However, the error rates for lexical items clearly shows that this is not the case. Table V also shows that the average sentence length in lexical items for higher-functioning informants exceeded that for the lower-functioning informants. Since, in this case, these differences reflect the higher-functioning informants' greater usage of compound and complex sentence structures, average sentence length is an additional indicator of greater syntactic sophistication.

Finally, the phrase structure units that account for the defective sentences are presented in Table VI. The units have been ordered to coincide with the phrase structure rules presented in Table II. The data in Table

VI show the distribution of lexical utterances or the occurrence of syntactical elements, and the per cent error for catagories (phrase structure units). A simple explanation of these data is not apparent to the authors. It is of interest and value to examine the column, or informant, data; and it is equally challanging to examine the row, or category, data. While many patterns might be discussed, a few seem especially noteworthy.

In any given corpus the numerical occurrence of a category does not in itself predict the error rate. Further, for each informant higher error rates are found in noun phrases than in verb phrases. In the latter area all subjects experienced greater difficulty with aspect than with any other constituent of the verb phase (MB's error rate for modals was not considered in this comparison since only two modals occurred in his corpus). Finally in examining the column data, the occasions in which a determiner was manifested as an article provided the only errors of determiners except in the case of BK.

In the comparisons across subjects for a given catagory, a general decrease in error rate as a function of an increase in intelligence is found for conjunctions, pronouns, and transitive verbs. The ratio of nouns to pronouns changes as a function of intelligence with nouns being twice as frequent in the corpus of the lowest subject and pronouns being twice as frequent in the utterances of the highest subject. On the other hand there is neither a proportional increase in occurrence nor decrease in error rate as a function of intelligence for items involving aspect.

DISCUSSION

As indicated in the preceding section, the data obtained from the six informants showed certain similarities and certain marked differences. Preliminary examinations of the transcripts for several additional informants at comparable IQ levels indicates that overall occurrence and error patterns will be similar in those additional cases. It is assumed also that as additional IQ groups are added the range of performance will be expanded, but that these additional data will not negate the patterns reported here.

Earlier it was noted that the informants were divided into two IQ groups. Data on lexical error rate, however, do not support this division, but rather suggest that CN belongs with the lower group and that only two of the informants belong in the higher group. Other data (such as those dealing with occurrences of sentence types, lexical errors, and grammatical category errors) can be cited to support one position or the other. The authors believe that such a question cannot be totally resolved, since the criterion measure of IQ is a continuous and complex variable. It is of interest, however, that two measures provide fairly close estimates of each informants's IQ. While this is true for the IQ range sampled, it is

TABLE VI
OCCURRENCES OF GRAMMATICAL CATEGORIES AND
ERROR RATES FOR SIX INFORMANTS

Grammatical Category	Informant (lexical total) RC (326)	MB (345)	DN (490)	CN (516)	BKu (1237)	BK (855)
SENTENCE						
INTERROG	2	3	0	1	11/8	9
ADV	3	1	5	13	27	13
CONJ	10/40	22/37	22/32	46/22	63/5	57/4
S	68	73	9	103	190	146
S						
NP	60/32	55/16	85/27	101/24	209/9	153/4
VP	88/1	109	136	152/3	309	211
NP						
N	104/3	89	99	93/4	179	101
PRON	46/44	62/15	98/24	112/21	275/8	234/3
PP	0	0	2	2	0	0
S	1	3	7	5	29	16
S rel	1	0	0	0	8	1
s	12	9	24	25	49	26
D						
ART	55/22	46/39	50/14	43/19	75/4	39/3
POSS	13	5	5	10	12	17/6
ADJ	18	33	26	19	97	52
VP						
ADV	0	0	0	1	1	1
MV	87/1	109	136	148	305	210
AUX						
TENSE						
past	7	19	8	23	48	39/3
pres	65/2	59/5	91/1	83/1	185/1	126/2
INFIN	5/60	5	16/25	17/6	32	22/5
MODAL	2	2/50	2	10/20	35	20/5
NEG	2	0	2	7/14	20	12
ASPECT	19/26	15/47	24/42	22/27	42/41	34/15
MV						
ADV	39/5	40	63	56	162/1	109
COP	1/100	4	3/33	6/33	18	24/4
PRED	3	11	5/20	9	26	33
V_I	24/8.3	16/6	47/4	50/4	101/4	42/5
V_T	46/7	45/9	68/7	76/4	140/4	112/1
NP	55	74	79	83/2	159/2	126

Grammatical Category	Informant (lexical total) RC (326)	MB (345)	DN (490)	CN (516)	BKu (1237)	BK (855)
ADV						
ADJ	1	3	4/25	6	21/5	29
PP	39/3	34	62	50	140	93
adv	5/20	13	31	34	94/1	45
NEG	0	0	0	0	8	8
PRED						
NP	2	10	2	5	19	11
ADV	1	1	3	4	8	22
PP						
PREP	35/11	29/17	61/3	45/7	123/2	91/2
NP	39/3	28	56	45/2	130	83
S rel						
rel pron	1	0	0	0	8/13	1
s	0	0	0	0	1	0

unlikely that the relationship would hold if the limits of the range were increased significantly.

Although the MR population is commonly recognized as having a high occurrence of speech and language disorders (Matthews, 1957; Spradlin, 1963), it is of considerable importance in terms of the educational program for a retardate to define his language disorders as being ones of competence or of performance. In other words, it is important to know whether one is actually teaching the MR the rules of his language, or simply encouraging him to use the rules he already knows. It is the belief of the authors that the question cannot be answered completely at the present time. The results of our studies to date, however, strongly suggest that the mildly or moderately retarded individual posses full or at least adequate linguistic competence and that whatever communicative deficit he may have is attributable to problems of performance. The necessary data to accept or reject this hypothesis are not totally available at present, but the available data substantiate the position that for any given error in syntax, examples of correct usage of the construction can be found. For this reason, the authors have accepted the working hypothesis that if any significant amount of spoken language (which of course would not include naming, echolalia, etc.) is used by a retarded individual, adequate linguistic competence is probably present.

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THE SENTENCE REPETITION TEST

In an earlier paper (Graham and Graham, 1969), we discussed a method for developing a description of language characteristics of the retarded, one which has the following disadvantages if it is to be used extensively: (1) the process of obtaining language samples is extremely time consuming and the analysis is complex, (2) those aspects of syntax that are the major problem areas for a given retardate may not be discovered since he may avoid them completely, and (3) the use of the corpus procedure assumes that the retardate will produce a large enough sample of spontaneous discourse for the methods of corpus analysis to be fruitful.

In an attempt to circumvent the problems of corpus analysis, we have experimented with an ellicited-imitation procedure reported to be useful in probing the language of young normal children (Slobin, 1967; Slobin and Welsh, 1967). This procedure consists of presenting a set of model sentences to a subject and asking him to repeat each as exactly as he can. A well-designed test of this kind allows for a more rapid collection of much more complete information about a subject's linguistic system than is likely to be obtained from the analysis of spontaneous utterances alone (Ervin-Tripp, 1967), and the analysis of the imitations is not necessarily complex.

The exact processes subjects use to manipulate the sentences presented for imitation are debatable, but at least it can be assumed that if the child knows he is to repeat a sentence he must process what he hears and store it in some manner in order to reproduce what he heard. For example, in the Slobin and Welsh (1967) study, the sentence THE MAN WHO I SAW YESTERDAY GOT WET was repeated by a two-year-old as I saw the man and he got wet. The child's repetition could be interpreted to indicate that her productive rules did not include a rule for producing a who construction but that she understood her language to the extent that she could process the sentence given to her (derive its meaning) and retain its meaning in returning it. In other words, the sentences given by the examiner are assumed to filter through the subject's own linguistic system in some manner and the errors, deletions, and rearrangements he imposes as he reproduces them should reflect at least some characteristics of that system so that the subjects' reproduction of sentences can be used to gain an understanding of what he knows about his language and of what his productive capabilities are.

METHODS

Since a sentence repetition test is designed to discover something about the manner in which subjects process sentences as meaningful samples of language, sentences should, in general, exceed subjects' auditory memory span for a series of unrelated words, although this need not always be the case. The present test included examples of both relatively long and

relatively short sentences. Another consideration in constructing such a test is to structure its length so that performance does not deteriorate simply as a result of too lengthy a test. It was found that twenty sentences were a number that the present subjects could complete easily in a single testing session. Only a short training period was necessary to convey the idea of the task to the subjects. The simple instructions, "I want you to say exactly what I say" and three practice sentences: (A) I LIKE TO PLAY, (B) JOHN GOES TO SCHOOL EVERY DAY, and (C) OUR TEACHER IS NICE TO US were sufficient for training.

Since the purpose of this study was to evaluate the sentence repetition procedure as a rapid means of estimating the results that are obtained from a large, spontaneous set of utterances (a corpus), the six informants whose corpus data were reported in Graham and Graham (1969) were again used as informants. The present data were collected approximately three months after the subjects had provided their corpora.

The sentence repetition test was developed on the basis of results obtained from the corpus analysis of one informant (MB). The model sentences, therefore, were intended to sample the areas in which MB showed difficulty in spontaneous utterances as well as to sample syntactic constructions, in general. The sentences were never taken directly from MB's corpus, but often were modeled after his sentences. The test is shown in Table I.

TABLE I
SENTENCE REPETITION TEST

1. The picture is green brown and red.
2. The school work should have been fun.
3. The game was won by our team.
4. You get candy sometimes when you are good.
5. He couldn't play because he didn't do his work.
6. They are sitting on the floor and reading the stories.
7. If it doesn't rain tomorrow we will go walking.
8. Delivering things is my job.
9. When someone works hard they often win.
10. He has the ball a balloon and some gum.
11. John was pulling the box out from under the table.
12. Returning to camp is fun.
13. The bus comes in the morning and it stops at the corner.
14. I wanted to go but she said no.
15. Bill was hit by a car.
16. While I was at school my bike was stolen.
17. That is my book.
18. We knew she had it.
19. She took our class to the movie.
20. The man had finished his work or he would not have gone.

To determine the efficiency of the test as a predictor of the corpus, the sentences were adminsitered to MB and, subsequently, to the other five informants. As with corpus material for each informant, the complete test was tape-recorded, making it easier to resolve questionable items at a later time.

It should be understood that if the purpose of the present investigation had been to study the language of the informants through the use of the ellicited-imitation procedure instead of to compare sentence repetition and corpus data, the test would have been considerably longer and would have sampled much more completely the possible syntactic constructions. It should be understood also that in analyzing the results of testing, two types of errors were considered: (1) instances in which a subject reconstructed a sentence and destroyed its original content (for example, the team by our team was given for THE GAME WAS WON BY OUR TEAM) and (2) instances in which the original meaning of the model was preserved, but where a syntactic error was made (for example, he has some ball and a balloon and gum was given for HE HAS THE BALL, A BALLOON, AND SOME GUM). In the repetitions of all informants, there were instances in which model sentences were not reproduced exactly, but where the alterations did not change the basic syntax or the essential meaning of the models (for example, when I was at school my bike was stolen was given for WHILE I WAS AT SCHOOL MY BIKE WAS STOLEN). These cases were not considered as errors in the present analysis.

RESULTS

Since the model sentences used in this study were developed from an analysis of the corpus of MB, if the original hypothesis about the predictive value of sentence repetition testing has any validity, MB's errors in sentence repetition should have been reflective of the problem areas in his corpus. This fact is clearly shown in several instances. MB's understanding of the function of and the lexical difference between various prepositions, for example, was questioned by sentences that appeared in his corpus. For example, Boys Beaver to be correct should have been Boys at Beaver and the sentence They are looking to see where the cat went at, although probably not completely incorrect, is certainly an unusual construction. In the sentence repetition test similar errors occurred as seen in the responses presented in Table II. In the first example MB eliminated the preposition entirely and in the second example he changed a preposition to an adverb and used a substitute preposition in the other case where a preposition appeared in the model sentence. These changes in the second example alter the meaning (although subtly) in each of the two segments of the sentence. These preposition errors cannot be considered to be errors of competence, however, since MB correctly repeated such sentences as THEY ARE SITTING ON THE FLOOR AND READING THE STORIES in sentence repetition testing and constructed such sentences as Happy Birthday to her in his spontaneous

TABLE II
EXAMPLES OF ERRORS IN SENTENCE REPETITION TESTING FOR MB

(The model sentence appears in capital letters and the subject's reproduction appears in lower-case letters.)

RETURNING TO CAMP IS FUN
returning camp the fun
THE BUS COMES IN THE MORNING AND IT STOPS AT THE CORNER
the bus comes every morning and stops by the corner
WHEN SOMEONE WORKS HARD THEY OFTEN WIN
someone works hard they always win
HE COULDN'T PLAY BECAUSE HE DIDN'T DO HIS WORK
he couldn't play he didn't do his work

speech. In other words, he demonstrated that he knows rules about prepositions, but he doesn't always apply them. It should also be noted that the second example in Table II shows a fairly good example of rephrasing for a sentence that MB was unable to repeat in its original form. Although he has altered the meaning somewhat, he approximated it in changing the syntactic construction of the sentence.

MB demonstrated another major problem area in his corpus by his handling of conjoined sentences. Illustrative of his corpus errors are the following; There's junk on the floor, I clean it up, which should have been something like, If there's junk on the floor I clean it up and Put it together play with it rather than Put it together and play with it. He demonstrated similar problems by his reproductions of model sentences from the sentence repetition test. These reproductions are shown in the last two examples of Table II. There were, however, instances both in his corpus and in his imitations of model sentences where conjunctions were used correctly in similar constructions, again indicating that the problem is one of performance not of competence.

In addition to being predictive of the corpus errors for prepositions and conjunctions, the sentence repetition test accurately predicted MB's problems in the use of aspect and copular verbs. However, for MB, the sentence repetition test was not an adequate predictor with respect to the use of determiners, with which he demonstrated a considerable problem in his spontaneous speech.

A second subject, RC, was like MB in many respects. He was of the same age, the same IQ level, and he showed a similar poor language performance in spontaneous utterance, although his major errors occurred in different categories than MB's. It was important, therefore, to know whether the model sentence, initially constructed on the basis of the

language behavior of MB, would be indicative of the language behavior of RC, and of the other informants as well.

Although qualitatively different, RC performed quantitatively in a manner that was very similar to MB and, like MB, RC's errors in reproducing the model sentences also agreed well with the errors revealed by an analysis of his own corpus material. In the sentences of his corpus, RC frequently deleted a required subject noun phrase and verbal auxiliary of aspect. This was demonstrated in his corpus material by the sentence Fixing his bed which should have been She is fixing his bed. He made the same type of error in sentence repetition as shown in the first example of Table III.

TABLE III
EXAMPLES OF ERRORS IN SENTENCE REPETITION TESTING FOR RC

THEY ARE SITTING ON THE FLOOR AND READING THE STORIES
sitting on the floor and reading the stories
IF IT DOESN'T RAIN TOMORROW, WE WILL GO WALKING
it doesn't rain tomorrow we will go walking
THE MAN HAD FINISHED HIS WORK OR HE WOULD NOT HAVE GONE
he have gone

In addition to his problems in the use of subject noun phrases and those constructions involving aspect, the sentence repetition test was predictive of RC's corpus errors for conjunctions, determiners, adverbs, modals, negatives, copular verbs, and intransitive verbs. (The second and third examples in Table III show some of these problems). In the case of the last four catagories, the high error rates in sentence repetition predict not a high error rate in the corpus, but a low occurrence of the category in his corpus. It should be remembered that a disadvantage in the corpus approach to the analysis of syntax is that constructions that present problems for an informant may not be discovered since the informant may not use them. The sentence repetition test did not predict the high pronoun error rate or the low noun error rate in RC's corpus. It falsely indicated that RC would have equal difficulty with nouns and pronouns.

As was the case for MB, RC provided other examples of both correct and incorrect usage of syntactic patterns in his corpus material and in reproductions of model sentences. Therefore, once again the errors were ones of performance and do not offer evidence that RC lacks competence in the areas discussed. RC provided an excellent example of rephrasing without alteration of meaning when he repeated the model sentence YOU GET CANDY SOMETIMES WHEN YOU ARE GOOD as sometimes you get candy

if you are good.

The final informant in the low IQ group, DN, provided responses to the model sentences that identified his difficulty with aspect, pronouns, modals, and copular verbs (see examples in Table IV). His responses to the model sentences, however, did not predict his corpus errors for conjunctions, predicates, adjectives, pronouns, and subject noun phrases. Again performance problems rather than lack of competence was shown in both the test results and the corpus material by examples of correct usage for all types of errors.

TABLE IV
EXAMPLES OF ERRORS IN SENTENCE REPETITION TESTING FOR DN

THEY ARE SITTING ON THE FLOOR AND READING THE STORIES
sitting on the floor and reading the stories
IF IT DOESN'T RAIN TOMORROW, WE WILL GO WALKING
if it doesn't rain tomorrow, we go walking
DELIVERING THINGS IS MY JOB
delivering things my job
WE KNEW SHE HAD IT
knew she had it

As was the case for the previously discussed subject, DN provided an example of good rephrasing. His response to the model sentence THE MAN HAD FINISHED HIS WORK OR HE WOULD NOT HAVE GONE was This man's finished his work or he would never have gone. Although he altered the sentence, he preserved its original meaning.

In the higher IQ subject group, CN's sentence repetition test results agreed well with his corpus errors. The test results correctly predicted that he would have difficulty with conjunctions, subject noun phrases, pronouns, determiners, copular verbs, and the use of aspect. Sentence repetition test results, however, failed to predict his high incidence of errors for modal constructions in spontaneous utterrances. All of CN's modifications of model sentences were like those shown in Table V. He did not provide any good rephrasings.

The two remaining subjects, BKu and BK, both demonstrated difficulty with the use of aspect in their corpora but were able to use all other constructions adequately and appropriately. In neither case did these subjects made similar errors during sentence repetition testing. Each subject made a single error on the test: a modal error for BKu and a determiner error for BK. Further, neither BKu nor BK produced what could be considered as a good rephrasing in repetitions of model sentences.

TABLE V
EXAMPLES OF ERRORS IN SENTENCE REPETITION TESTING FOR CN

THE PICTURE IS GREEN, BROWN AND RED
green, brown and red
THEY ARE SITTING ON THE FLOOR AND READING THE STORIES
sitting on the floor and reading the stories
HE HAS THE BALL, A BALLOON, AND SOME GUM
ball, balloon, and some gum
THE BUS COMES IN THE MORNING AND IT STOPS AT THE CORNER
bus comes in the morning it stops at the corner

DISCUSSION

The results indicate that the test, as constructed, is a good predictor of specific syntactic errors for those subjects with high corpus error rates, but that it is much less sensitive in identifying the errors made by subjects with low corpus error rates. It will be recalled that the division of the subjects into two groups was an arbitrary one, and that it was based on IQ levels. When such a division is made, it is difficult to explain the findings for one member of the higher group. The results of sentence repetition testing predicted CN's corpus errors as well as it predicted those for the three members of the lower IQ group. The discrepancy could be avoided by making the division into groups on the basis of the informants lexical error rates (Graham and Graham 1969). If those data are used, CN is clearly a member of the lower group. However, while moving CN to the lower group provides a simple solution to the problem, it is probably not justified since further examination of his performance on both tasks offers an alternate explanation which justifies his being a member of the high group, however precariously. In both his corpus material and his responses to model sentences, CN showed his greatest difficulty in handling constructions that involved pronouns. The occurrence of pronouns in his corpus, however, was higher than that for nouns, a characteristic of the higher IQ group and the one that most clearly marks it as being different from the lower group. Thus, it is hypothesized that the quantitative similarity is more important than the qualitative difference and that CN is stretching himself in his use of language as he attempts to operate within the higher group and that he, therefore, makes a far greater number of errors than those members of that group who are higher on the IQ continuum.

The failure of the test to yield any signigicant data concerning the two highest IQ subjects now seems obvious. The test was simply too easy for them and did not tax their processing systems.

The occurrence of good rephrasings of model sentences by all three members of the lower IQ group, but not by the three members of the higher

group is an interesting finding. Although neither the results of the present study nor a comparison of them with the findings of Slobin and Welsh (1967) provides a complete explanation, it can be hypothesized that the three higher subjects would have rephrased had the model sentences been more complex. Certainly, the occurrence of rephrasings is an area that needs further study both in terms of its occurrence and in terms of how the syntactic elements are rearranged or substituted.

The results of this limited use of the sentence repetition approach with the mentally retarded lead the authors to the following tentative conclusions. On the basis of the differences in findings for the two groups of subjects discussed here, it is concluded that one should not use the same set of model sentences with subjects at widely different IQ levels. Further, the authors are not advocating that sentence repetition be used in place of gathering and analyzing corpus material. Until additional research is conducted both with corpus procedures and with sentence repetition procedures, it will not be possible to predict corpus errors with sufficient accuracy to justify replacing corpus analysis with sentence repetition testing. However, it is believed that, if one wishes to study a large number of subjects and is content to have only limited information concerning any given subject, the results of sentence repitition testing will indicate the types of syntactic errors a subject would be likely to make in spontaneous discourse. This assumes, of course, that the sample is a homogeneous one and that the experimenter already has some knowledge about the language characteristics of the subject group to be studied. Slobin and Welsh (1967) caution that information that is gained about a subject's language through imitation procedure should be considered as a conservative estimate of his linguistic competence. However, since they studied one child in depth (1000 ellicited imitations) while the present study was concerned with a very cursory evaluation of the procedure for several subjects, we do not have data bearing on this issue at present. It is, however, certainly one worth further study.

It is suggested that the sentence repetition procedure may be an excellent method for studying the language of shy children who will not readily provide sufficient spontaneous conversation to yield an adequate corpus. In Graham and Graham (1969) it was mentioned that one prospective subject did not provide spontaneous conversation even after eight sessions, although it was reported that he does converse with friends in his cottage. Although the sentence repetition procedure was not used with this particular retardate, the authors believe that this is the only feasibal way in which one could gather data about his language.

Finally, the authors are in total agreement with the implications of Slobin and Welsh (1967) that one of the values of sentence repetition testing is that it allows for the same or similar model sentences to be readministered periodically in order to study the ways in which a particular child's rules of language are changing.

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